

Medicinal Plants in Light of History: Recognized Therapeutic Modality

Journal of Evidence-Based
Complementary & Alternative Medicine
2014, Vol. 19(3) 216-219
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DOI: 10.1177/2156587214533346
cam.sagepub.com



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Abstract

Medicinal plants have an unbelievable history in terms of serving humanity in almost all continents of the world. Traditional healers have transferred that incredible knowledge from generation to generation. Even modernity or cultural revolutions have not altered the in-depth wisdom of this natural medical paradigm. Pharmacological rationale in light of traditional uses followed by phytochemical studies could surely bring a new revolution in the treatment of diseases.

Keywords

medicinal plants, historical perspective, global recognition

Received March 25, 2014. Received revised March 28, 2014. Accepted for publication March 29, 2014.

Introduction

For thousands of years, medicinal plants have been used in various cultures of the world as a safe therapeutic modality. The operation of medicinal plants is based on the rich experiences of innumerable healers over centuries, inherited from ancestors, healer-to-healer transfer, or developed through personal experiences over time. Modernity or cultural revolutions have not altered the in-depth wisdom of this natural medical paradigm. Consequently, no modern system of medicine can ordinarily lay claim to it. The traditional system of treatment, differing in concept and protocol, exemplifies well-developed systems such as allopathic, homeopathic, ayurvedic, and Chinese systems of treatment.^{1,2} Most of the civilized nations have developed their own *Materia Medica*, compiling details about various plants used for therapeutic purposes. The merging of this human pharmacopoeia of natural origin with the incredible development in the various fields of modern medical sciences indeed provides the foundation for a much needed revolution in the existing health care system.³⁻⁵

Extensive investigations have revealed that medicinal plants in different shapes, either in crude form or pure molecules isolated from them, represent the most ancient mode of medication. Archaeological studies have been provided reasonable evidences that the healing properties of plants were known to peoples in prehistoric time.⁶⁻⁸ Since the medicinal usage of the plants is as old as human civilization, some of the oldest references are available in the Artharvaveda, which is the basis of the traditional Indian medicine called ayurvedic medicine (dating back to 2000 BCE). Mesopotamians (1700 BCE)⁹ described the use of clay tablets, and there is documented evidence of the use of Eber Papyrus by Egyptians (1550 BCE).¹⁰ Other documented data that revealed the medicinal usage of

plants are *De Materia Medica*, written by Dioscorides between CE 60 and 78, and *Pen Ts'ao Ching Classic of Materia Medica*, written around 200 CE.¹⁰

Utilization of Medicinal Plants in Various Cultures

Greek Period

Greek civilization was an epoch of science and philosophy. The Greeks have made worthy contribution in pharmaceutical sciences, especially in phytopharmaceuticals.⁶ Aristotle has described 500 crude drugs used in the cure of different pathological conditions.¹¹ Hippocrates (460-337 BC) is considered as the father of allopathic medicine. He formulated the first scientific medical paradigm of treatment. He proposed that a large number of pathological conditions were due to disturbance in the normal physiology of human systems. The treatment was, therefore, based on the causes of the diseases to normalize the imbalance body systems.¹² He has pointed out nearly 400 samples of medicinal substances from plant origin. Theophrastus (370-287 BC), a student of Aristotle,¹³ has also mentioned 500 crude drugs in his book. Another important name is that of Claudius Galen Pergamum (modern-day Bergama, Turkey: 129-199). He prepared vegetable drugs using different extraction techniques called *Galenicals* and introduced the concept

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of pharmaceutical formulation to formulate stable and therapeutically effective drugs.^{14,15} He wrote some 300 books on plants.

Traditional Chinese Medicine

Traditional Chinese Medicine represents one of the oldest systems of treatment. Traditional Chinese medicine is unique in theories, treatment, and therapies. This effective system of medicine has tremendous importance in the history of medicine and has now received global recognition due to its evidence basis approach.¹⁶ This system is nearly free of external influence. Fu His (2953 BC) is considered as the pioneer of this system of medicine. The prescription of traditional Chinese medicine addresses those exogenous factors that are considered to be engaged in the pathology.¹⁷ Later, emperors Shen Nung and Hong Ti developed this system more significantly. Chinese pharmacopoeia *Pen Tsao* contained large numbers of remedies for various medical problems. Crown of written Chinese medicine goes to Shen Nong Ben Cao Jin (22-250 AD). Cao Yuan Fang (550-630) wrote a book titled *Zhu Bing Yuan Ji Lun*, which described the etiology and symptoms of various diseases. This book is considered as a standard reference book for Chinese medical students.¹⁷

Wang Tao (702-772) has had an important contribution to traditional Chinese medicine. His published work *Waitai Miyao* described approximately 600 prescriptions. The foundation of his diagnostic philosophy was tongue. During different pathological conditions, the color and status of tongue changes.¹⁷ A great Chinese physician and naturalist, Li Shizen, has written a more inclusive pharmacopoeia *Ben Ca Gang Mu*, which was published in 1596. It has 1894 prescriptions and is still in use as reference and guide for research and schooling in China and several other communities. Importantly, traditional Chinese medicine was traditional knowledge that passed through generations, but only in the 1950s was it formatted in the form of academic educational training.¹⁸

Traditional Indian Medicine

Traditional Indian Medicine or ayurveda (known as the mother of all therapies) is considered as the oldest health care system on earth. The descriptions of the system are available in ancient literatures such as *Rig-Veda* and *Atharva-Veda*, approximately 5000 years BC.^{19,20} Ayurveda is a Sanskrit word that literary means *knowledge of life*. It is a natural healing system consisting of a mixture of physiologic and holistic medicine. Ayurveda defines man as a matrix of 7 basic tissues that works in harmony while disease is the outcome of imbalance in these components of the body.²¹

Arabic Period

The Arabs made enormous progress in the field of science and medicine after the fall of the Roman Empire. Scholars from the Islamic world translated books from Greece and Rome. Arab

physicians introduced the concept of diet control and exercise along with medications.^{22,23} Arabs are actually the pioneers in the start of basic pharmacy practices. This includes the foundation of drug stores, the job description of physicians as diagnosticians of disease, and pharmacists being deputed for drug extraction and formulation. Due to this demarcation, the development in each field has started. As a result of this, Jaber Bin Hayan, a Muslim chemist, extracted and isolated various chemicals like alcohols, nitric acids, sulfuric acids, and so on.²²

The religion of Islam has set a new breadth to the science of medicine in Arabia. Islam has specified means for a hygienic life style.²⁴ These principles are primarily focused on *Al Quran* and *Sunnah* and are titled as *Tibb al-Nabi*.²⁵ Ali Ibn Rabban Al Tabri (782-855 AD) was a renowned Muslim scientist. His book *Firdous Al Hikmat*,¹¹ consists of 7 parts in which one is specially focused on drugs and poisons. Abu Ali Al Hussan Ibn Sina (Avicenna, 980-932 AD) is the creator of the Greco-Arabic school of medicine.²⁶ His book *Canon* was considered as a textbook on medicine in Europe, which describes more than 1000 drugs. His other book, *Kitab Ash-Shifa*, is considered as a scientific encyclopedia. Apart from the therapeutic and healing characteristics, the Arabs also described the toxic aspects of various plants. Abu Musa Jabir ben Hayyan has written a very comprehensive book on different plant poisons and antidotes: *The Book on Poisons and Antidotes*.²⁷

Medicinal Plant in Pakistan

In terms of plants biodiversity, Pakistan possesses an incredible status among the developing countries most probably due to varied climatic and edaphic factors. This valuable heritage is scattered throughout the country. However, there is no systemic approach for the growth/cultivation of these plants. Around the country, including the Pakistan-occupied Kashmir, it has been speculated that there are approximately 6000 taxa of flowering plants. On the basis of ethnobotanical investigations, approximately 600 to 1000 plants have medicinal properties and only 12% are used in the management of different pathological conditions.^{28,29} In the local drug markets (*pansara*), approximately 350 to 400 species are traded and used by various manufacturers in the formulation of herbal preparations.³⁰

Current Status of Plant-Based Products

Over the years, extraordinary development has been made in the fields of chemistry such as synthetic, combinatorial, and biotechnological sciences, and medicinal plants can still be exploited as an initial point for the synthesis of new compounds with different structural parameters.³¹⁻³³ In the presence of these sophisticated technologies, plant-derived drugs become more streamlined. The proper utilization of these techniques has already led to the discovery of some interesting clinically useful molecules.^{32,33} Importantly, 15 compounds of natural origin have been launched from 2000 to 2003, and the same number of compounds are in the phase III clinical trials or registration stage of drug development.³⁴ It has been recently

estimated that natural products offer 100 times higher hit rate when compared with synthetic drugs.^{35,36} However, it is bitter truth that only 1 molecule out of 5000 successfully completes all stages of development and obtains registration for clinical applications.³²

Conclusions

In short, plant-based drugs have unmatched chemical diversity and an incredible potential of novelty with different mechanistic templates. Simply, nature has incorporated the best combinatorial chemistry in plants. Various research laboratories are currently involved in phytomedicines research with some outstanding success over the years. Consequently, several promising new chemical entities of plant origin are in the clinical trial phase. However, much more is needed to explore the unseen secrets of their curative potentials and to relieve humanity from dreaded diseases. Indeed, the surging waves of pragmatism based on the experimental findings in various research laboratories addressed the health care professionals. Ultimately, the modern medical setup is recognizing and moving to a system based on the combination of orthodox and natural therapies as a leading science to deal with the wisdom that lies in botanicals. The merging of this natural human pharmacopoeia with the incredible development in the various fields of modern medical sciences indeed provides the foundation for a much needed revolution in the existing health care system.

Declaration of Conflicting Interests

The author declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author received no financial support for the research, authorship, and/or publication of this article.

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